IN THE CLAIMS

Please cancel non-elected claims 36-47, and 78, without prejudice or disclaimer.

Claims 1 through 6. (Canceled)

7. (Previously Presented) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting essentially of carbon, indium tin oxide, nickel, magnesium, rhenium, molybdenum and platinum;

said needle-shaped conductive material being a carbonaceous material, said needle-shaped conductive material being in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material layer, and a thickness of said electron-emitting material layer being in a range of 30 to 80 μm.

Claims 8 and 9. (Canceled)

10. (Previously Presented) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material and having a surface roughness corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material layer being less than 10 microns.

Claim 11. (Canceled)

12. (Previously Presented) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting essentially of indium tin oxide, nickel, magnesium, rhenium, molybdenum and platinum.

Claims 13 through 15. (Canceled)

16. (Previously Presented) The cathode of claim 10, said needle-shaped conductive material in the electron-emitting material layer being in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material.

17. (Previously Presented) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material, and a thickness of said electron-emitting material layer being in a range of 30 to 80 μm.

Claims 18 and 19. (Canceled)

20. (Previously Presented) The cathode of claim 10, further comprising a metal layer including nickel grains having sizes smaller than sizes of grains in said metal base, said metal layer being formed between said metal base and said electron-emitting material layer.

21. (Previously Presented) The cathode of claim 20, said metal layer further including at least one metal selected from a group consisting essentially of aluminum (Al), tungsten (W), tantalum (Ta), chromium (Cr), magnesium (Mg), silicon (Si) and zirconium (Zr).

22. (Previously Presented) The cathode of claim 10, further comprising a metal layer formed between said metal base and said electron-emitting material layer, a thickness of said metal layer being in a range of 1 to 30 μm.

Claims 23 through 28. (Canceled)

29. (Previously Presented) An oxide cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting essentially of carbon, indium tin oxide, nickel, magnesium, rhenium, molybdenum and platinum;

said needle-shaped conductive material being a carbonaceous material, said needle-shaped conductive material being in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material layer, and a thickness of said electron-emitting material layer being in a range of 30 to 80 μm.

Claims 30 through 35. (Canceled)

36. (Previously Presented) The method of claim 78, wherein the coating step includes applying pressure on a coating layer in order to attain a desired level of surface roughness.

37. (Previously Presented) The method of claim 36, wherein the step of applying the pressure on the coating layer comprises at least one of printing, electrodeposition and painting.

38. (Previously Presented) The method of claim 37, wherein the printing includes at least one of screen printing and roll coating.

39. (Previously Presented) The method of claim 78, wherein the coating step comprises coating to a thickness in a range of 30 to 80 microns so as to obtain good electron emission characteristics.

40. (Previously Presented) The method of claim 78, said needle-shaped conductive material in the electron-emitting layer being in a range of 0.01 to 30% by weight based on a total weight of electron-emitting material.

41. (Previously Presented) The method of claim 78, further comprising the step, between the providing step and the coating step, of forming a metal layer on the metal base.

42. (Previously Presented) The method of claim 41, wherein the metal layer comprises nickel and a refractory metal to reinforce mechanical strength of the cathode.

43. (Previously Presented) The method of claim 41, further comprising the step, prior to forming the metal layer on the metal base, of mixing nickel powder and at least one of tungsten and aluminum as a reducing agent to prepare a metal layer material.

44. (Previously Presented) The method of claim 43, further comprising the step, after the mixing step, of homogeneously mixing the metal layer material with an organic binder and a liquid-phase organic solvent to prepare a paste which, when deposited on the metal base, forms the metal layer on the metal base.

45. (Previously Presented) The method of claim 41, wherein the forming step comprises applying metal layer material to the metal base, and then thermally treating the applied metal layer material in one of a vacuum and an inert gas atmosphere to obtain the metal layer without organic matter.

46. (Previously Presented) The method of claim 41, wherein the forming step comprises one of printing, spraying, electrodeposition and painting.

47. (Previously Presented) A cathode prepared by the method of claim 78.

48. (Previously Presented) A cathode, comprising:

a metal base;

layer means disposed upon said metal base for emitting electrons; and

additional means for providing electrically conducting paths through said layer means for emitting electrons, said additional means comprising a needle-shaped electrically conductive material having a specific resistance not greater than 10^{-1} ohms centimeter, and comprising 0.01% by weight to 30% by weight of said layer means.

49. (Previously Presented) The cathode of claim 48, further comprising a metal layer exhibiting a grain size smaller than said metal base and interposed between said metal base and said layer means.

50. (Previously Presented) The cathode of claim 48, said needle-shaped conductive material being selected from a group consisting essentially of carbon, indium tin oxide, nickel, magnesium, rhenium, molybdenum and platinum.

51. (Previously Presented) A cathode, comprising:

a metal base;

a layer of electron-emitting material disposed upon said base; and

a needle-shaped electrically conductive material providing electrically conductive paths disposed throughout said layer of electron-emitting material;

said needle-shaped electrically conductive material having a specific resistance

not greater than 10^{-1} ohms centimeter.

52. (Previously Presented) The cathode of claim 51, further comprising a metal layer exhibiting a grain size smaller than said metal base and interposed between said metal base and said layer of electron-emitting material.

53. (Previously Presented) The cathode of claim 51, said conductive material comprising 0.01% by weight to 30% by weight of said layer of electron-emitting material.

Claim 54. (Canceled)

55. (Previously Presented) The cathode of claim 51, said layer of electron-emitting material having a surface roughness corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material being less than 10 microns.

56. (Previously Presented) A cathode, comprising:

a metal base;

a layer of electron-emitting material disposed upon said base; and

a needle-shaped electrically conductive material providing electrically conductive paths disposed throughout said layer of electron-emitting material;

said layer of electron-emitting material having a thickness in a range of 30 microns to 80 microns.

57. (Previously Presented) A cathode, comprising:

a metal base; and

a layer disposed upon said metal base;

said layer comprising an electron-emitting material, and a needle-shaped electrically conductive material disposed within said layer and having a specific resistance less than a specific resistance of said electron-emitting material.

58. (Previously Presented) The cathode of claim 57, said needle-shaped electrically conductive material providing electrically conductive paths in said layer.

59. (Previously Presented) The cathode of claim 57, said layer having a surface roughness corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material being less than 10 microns.

60. (Previously Presented) The cathode of claim 57, said conductive material having a specific resistance not greater than 10^{-1} ohms centimeter.

61. (Previously Presented) The cathode of claim 57, said layer having a thickness

in a range of 30 microns to 80 microns.

62. (Previously Presented) The cathode of claim 57, said conductive material comprising 0.01% by weight to 30% by weight of said layer.

63. (Previously Presented) A cathode, comprising:

a metal base; and

a layer disposed upon said base;

said layer comprising an electron-emitting material, and a needle-shaped electrically conductive material having a specific resistance not greater than 10^{-1} ohms centimeter.

64. (Previously Presented) The cathode of claim 63, further comprising a metal layer having a grain size smaller than a grain size of said metal base, and interposed between said metal base and said layer.

65. (Previously Presented) The cathode of claim 63, said conductive material comprising 0.01% by weight to 30% by weight of said layer.

66. (Previously Presented) The cathode of claim 63, said layer having a surface roughness corresponding to a distance between a highest point and a lowest point on a

surface of the electron-emitting material being less than 10 microns.

67. (Previously Presented) The cathode of claim 63, said layer of electron-emitting material having a thickness in a range of 30 microns to 80 microns.

68. (Previously Presented) A cathode, comprising:

a metal base;

a layer of electron-emitting material including an electron-emitting barium-based alkali-earth metal carbonate material disposed upon said base; and

a needle-shaped electrically conductive material providing electrically conductive paths in said layer of electron-emitting material;

said conductive material having a specific resistance not greater than 10^{-1} ohms centimeter.

69. (Previously Presented) The cathode of claim 68, further comprising a metal layer having a grain size smaller than a grain size of said metal base, and interposed between said metal base and said layer of electron-emitting material.

70. (Previously Presented) The cathode of claim 68, said conductive material comprising 0.01% by weight to 30% by weight of said metal layer.

Claim 71. (Canceled)

72. (Previously Presented) A cathode, comprising:

a metal base; and

a layer formed on said base from a carbonate paste comprising a barium-based carbonate electron-emitter and a needle-shaped electrically conductive powder;

said needle-shaped electrically conductive powder having a specific resistance not greater than 10^{-1} ohms centimeter.

73. (Previously Presented) The cathode of claim 72, further comprising a metal layer having a grain size smaller than a grain size of said metal base and interposed between said metal base and said layer.

74. (Previously Presented) The cathode of claim 72, said needle-shaped electrically conductive powder comprising 0.01% by weight to 30% by weight of said layer.

Claim 75. (Canceled)

76. (Previously Presented) The cathode of claim 72, said layer having a surface roughness corresponding to a distance between a highest point and a lowest point on a

surface of the layer being less than 10 microns.

77. (Previously Presented) A cathode, comprising:

a metal base; and

a layer formed on said base from a carbonate paste comprising a barium-based carbonate electron-emitter and a needle-shaped electrically conductive powder;

said layer having a thickness in a range of 30 microns to 80 microns.

78. (Previously Presented) A method of preparing a cathode for an electron tube, comprising the steps of:

providing a metal base;

depositing on said metal base a carbonate paste comprising a barium-based carbonate electron emitter and a needle-shaped conductive material; and

coating the carbonate paste containing the needle-shaped conductive material onto the metal base, and then drying to form an electron-emitting layer of the cathode.

79. (Previously Presented) The cathode of claim 17, said electron-emitting material layer having a surface roughness corresponding to a distance between a highest point and a lowest point on a surface of said electron-emitting material layer being less than 10 microns.